SNS All Hands

T.E. Mason
Associate Laboratory Director for the SNS

Thomas Auditorium

June 15, 2006

Oak Ridge, TN

OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY

Spring 1999

Spring 2000

Spring 2001

Spring 2002

Spring 2003

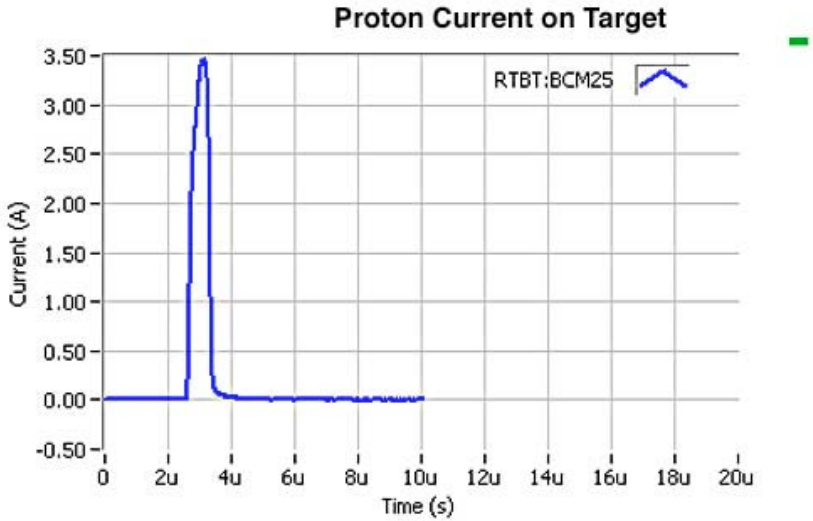
Spring 2004

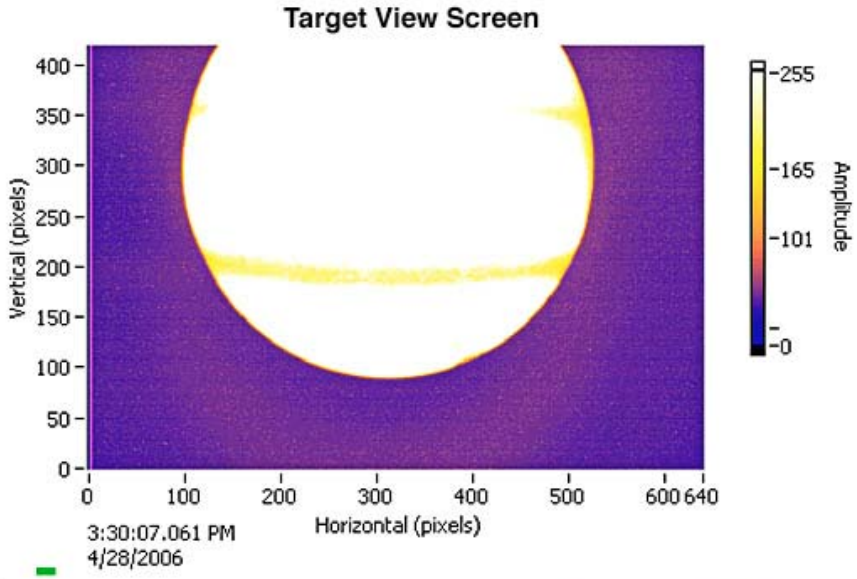
The Spallation Neutron Source

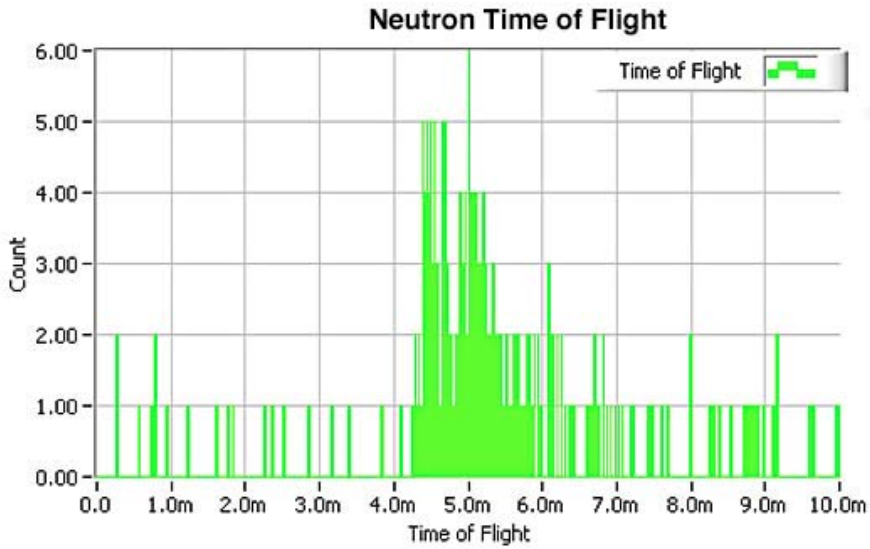
- The SNS will begin operation in 2006
- At 1.4 MW it will be ~8x ISIS, the world's leading pulsed spallation source
- The peak neutron flux will be ~20-100x ILL
- SNS will be the world's leading facility for neutron scattering
- It will be a short drive from HFIR, a reactor source with a flux comparable to the ILL

SNS Channel 4

Last Update: 4/28/2006 3:30:13 PM







Protons	12.6T	Goal 10T
Total Protons	201T	
Charge (C)	2.01u	
1-eV Moderator Coupling (n/ster/eV/p)	1.57u	
PEP-Specified Neutronics Units (n/ster/p)	30.2u	5m Achieved

Saturday NEWS SENTINEL
Knoxville
KnoxNews.com

NASCARXTRA

DAY OF PRAYER

Spallation celebration

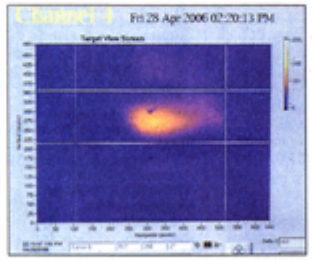
Neutron source's test drive paves the way for research

Spallation celebration

OAK RIDGE NATIONAL LABORATORY

Lab scientists, engineers, instrument specialists and others gather moments before the first neutrons were produced Friday at the $1.4 billion Spallation Neutron Source. The facility will allow cutting-edge studies of materials.

Neutron source's test drive paves the way for research



One of several diagnostic screens shows the successful delivery of protons to a mercury target, producing neutrons for scientific research of materials.

BY BOB FOWLER
fowlerb@knews.com

OAK RIDGE — They're finally making neutrons at the nation's premier science research project.

A proton pulse hit the target at 2:04 p.m. Friday and released trillions of neutrons at the Spallation Neutron Source facility.

"There was a loud cheer, and everyone clapped," said Thom Mason, project director. "There was a lot of relief and elation.

"There are a lot of happy people."

Mason described Friday's event as a "key technical milestone for completing the project."

"We're now officially a neutron source," he said.

Ninety minutes after the initial proton pulse hit the mercury target and released the trillions of neutrons Friday afternoon, researchers revved up the pulse's intensity, Mason said.

A beam with a 10 trillion proton pulse then hit the target to release neutrons, he said. A phosphorescent screen on the target showed the beam profile.

"It made a nice, pretty picture," he said.

That stepped-up proton pulse is the level of intensity needed for a host of scientific experiments planned at the Spallation Neutron Source, Mason said.

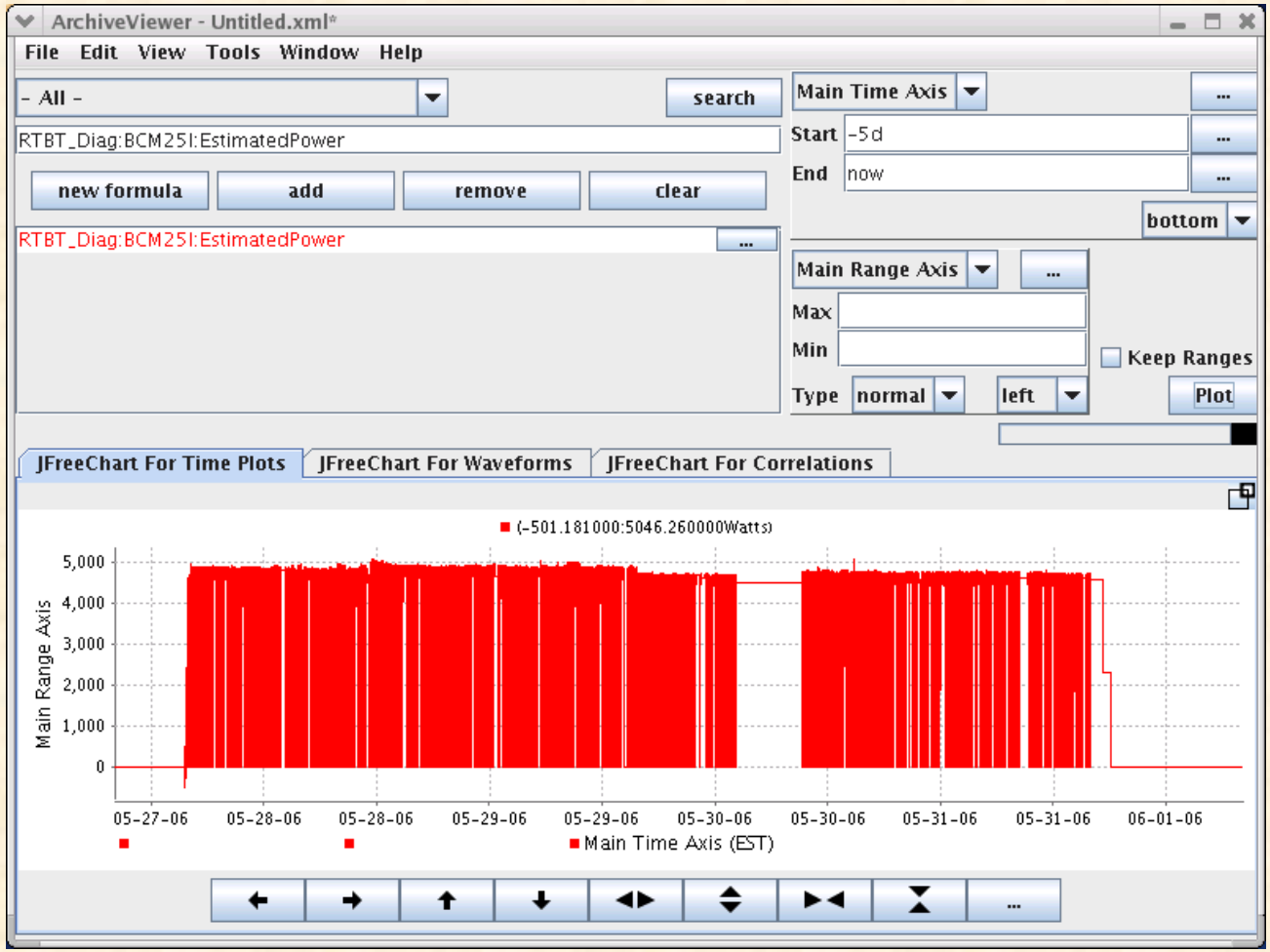
Even when it is running at just 20 percent of its maximum capacity, the facility will still be the most powerful source of neutrons in the world.

Scientists plan to use the $1.4 billion SNS to perform cutting-edge studies on various materials.

"We're now officially a neutron source."
Thom Mason,
Spallation Neutron Source project director

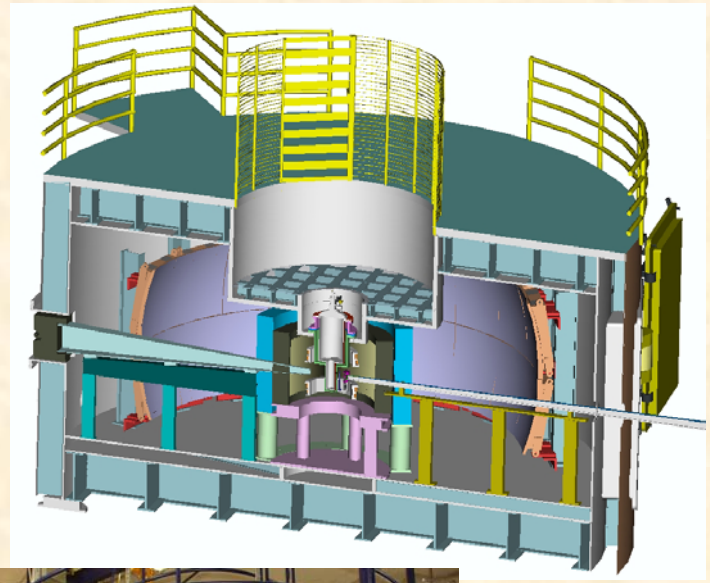
See **NEUTRONS** on A8

1st “Production Run”

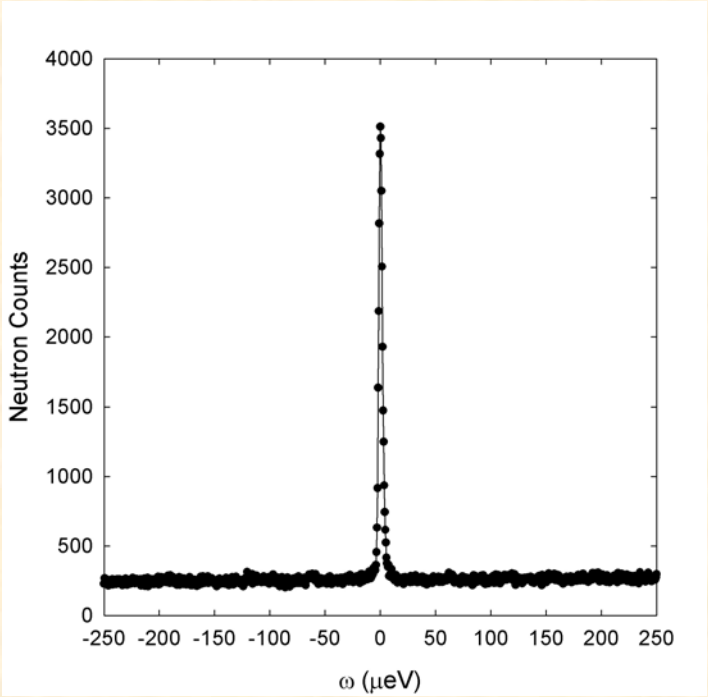


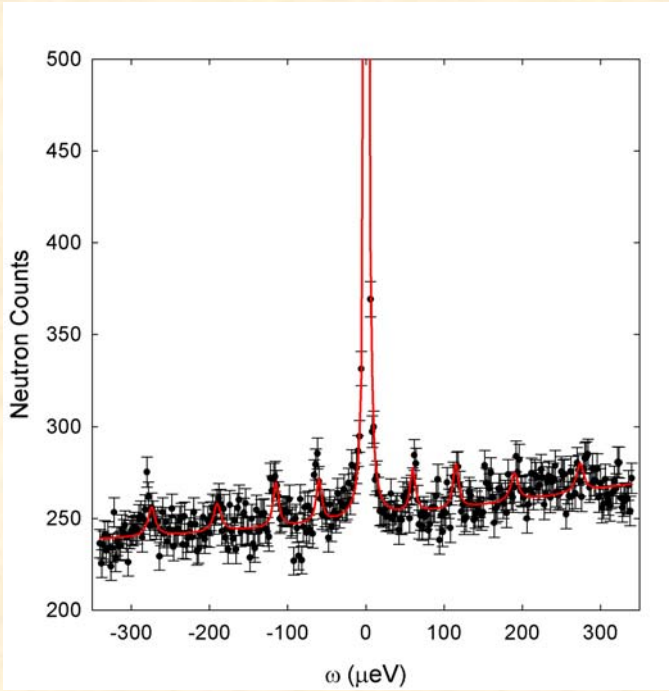
Backscattering Spectrometer

- **84 m incident flight path designed to provide high energy resolution – 2.5 μeV (fwhm) at the elastic line – slow dynamics (100's psec, 3 – 35 Å)**
- **Approximately 50 x faster then current world's best comparable instruments – better Q-resolution simplifies studies involving crystalline materials**
- **Si(111) analyzer crystals – 12.5 m^2 in baseline, upgradeable to 25 m^2**



1st Data (Herwig & Mamantov)

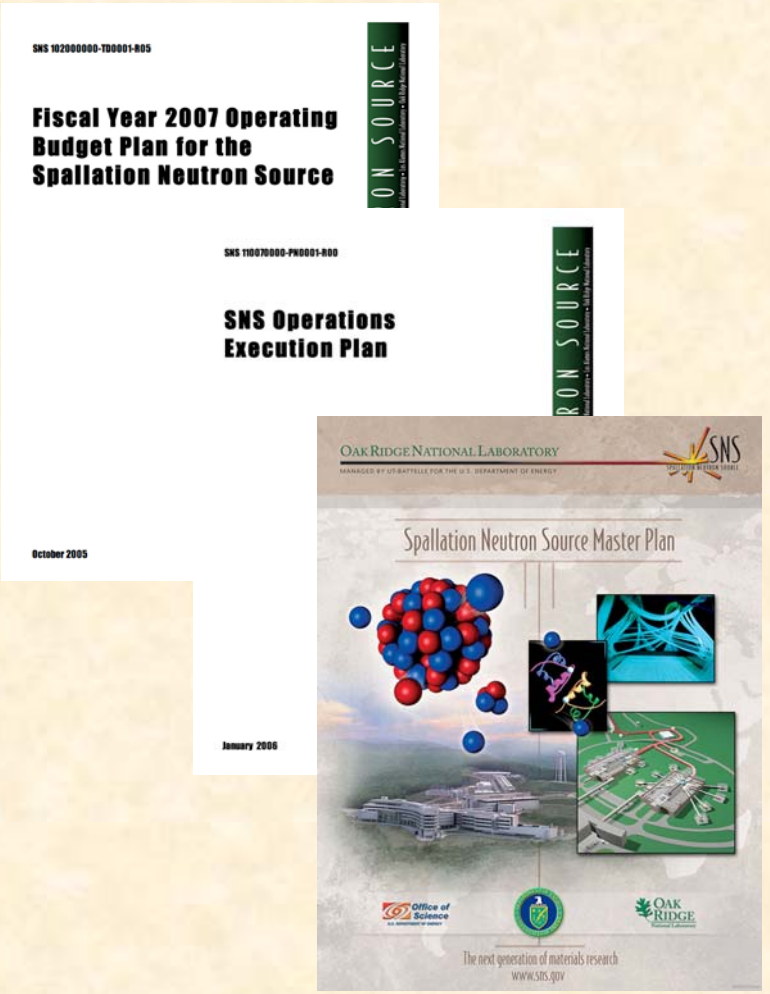




- **4-methyl pyridine (also called N-oxy gamma-picoline)**
- **T = 4K**
- **~25 % of the detector array, in air**
- **~5 kW (at 2 Hz) for ~ 3 hours**
- **δω ~ 3 μeV (need better alignment)**

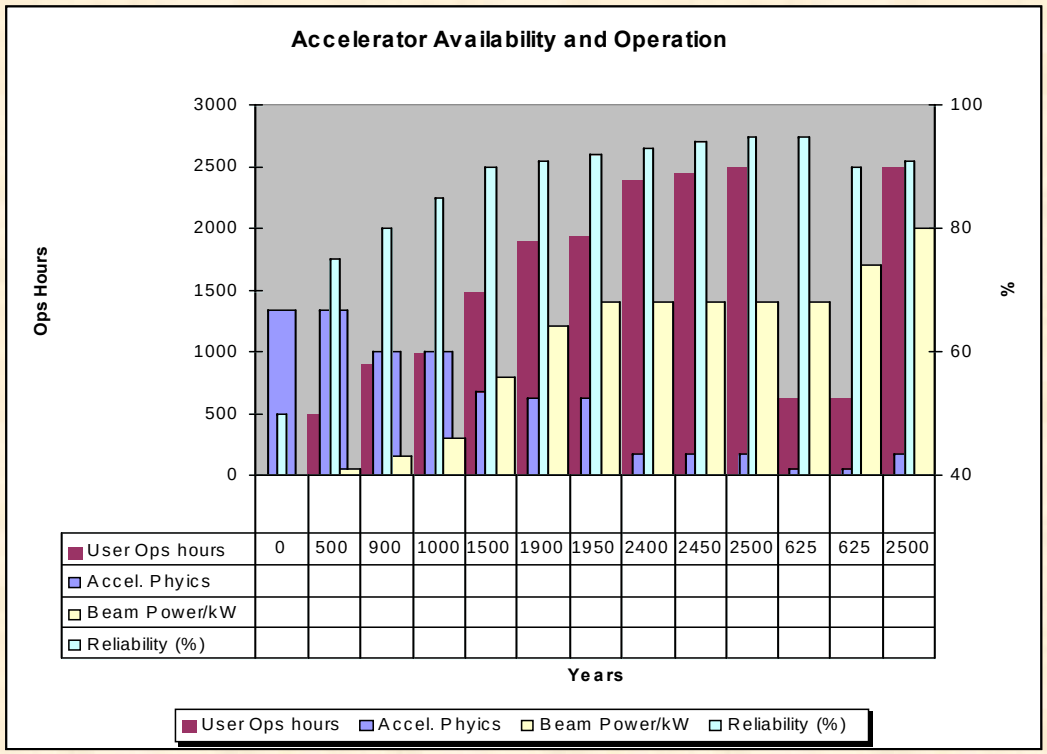
Planning and Prioritization for Operations - SNS

- **SNS Master Plan describes framework for achieving framework for realizing full potential of SNS**
  - **Operating philosophy and budget**
  - **Criteria for prioritization and ramp up to full user mode**
  - **Enhancement of capabilities**

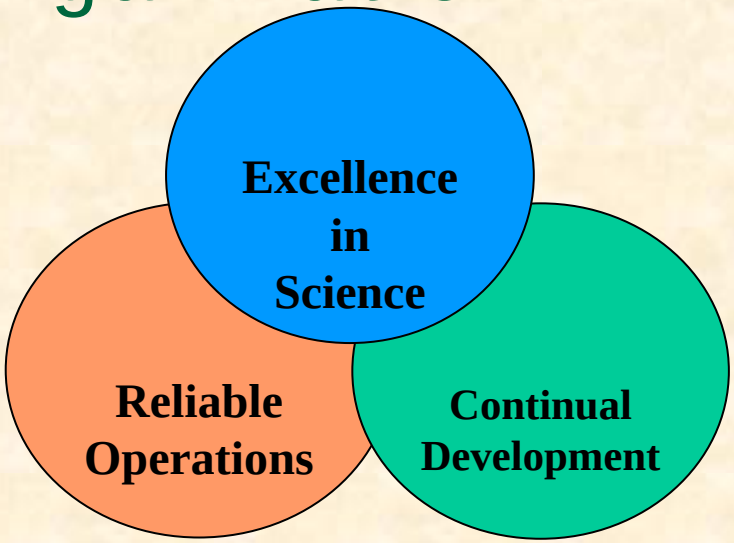


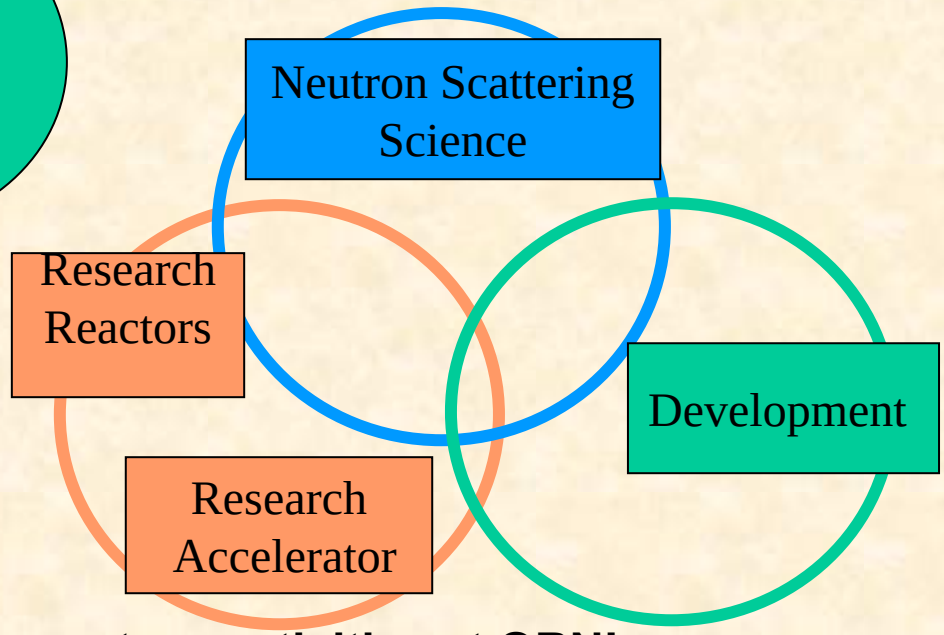
SNS Early Operations: Ramping up Scientific Productivity

- Timeline for a new instrument is ~4-5 years
- Beamlines at SNS will be fully committed in ~2-3 years
- FY2007 budget is robust and includes new instrument initiative
  - 20/24 beamlines are funded
- Work has begun on the Power Upgrade (x2!)
- Total funding in 2007 is $193 M



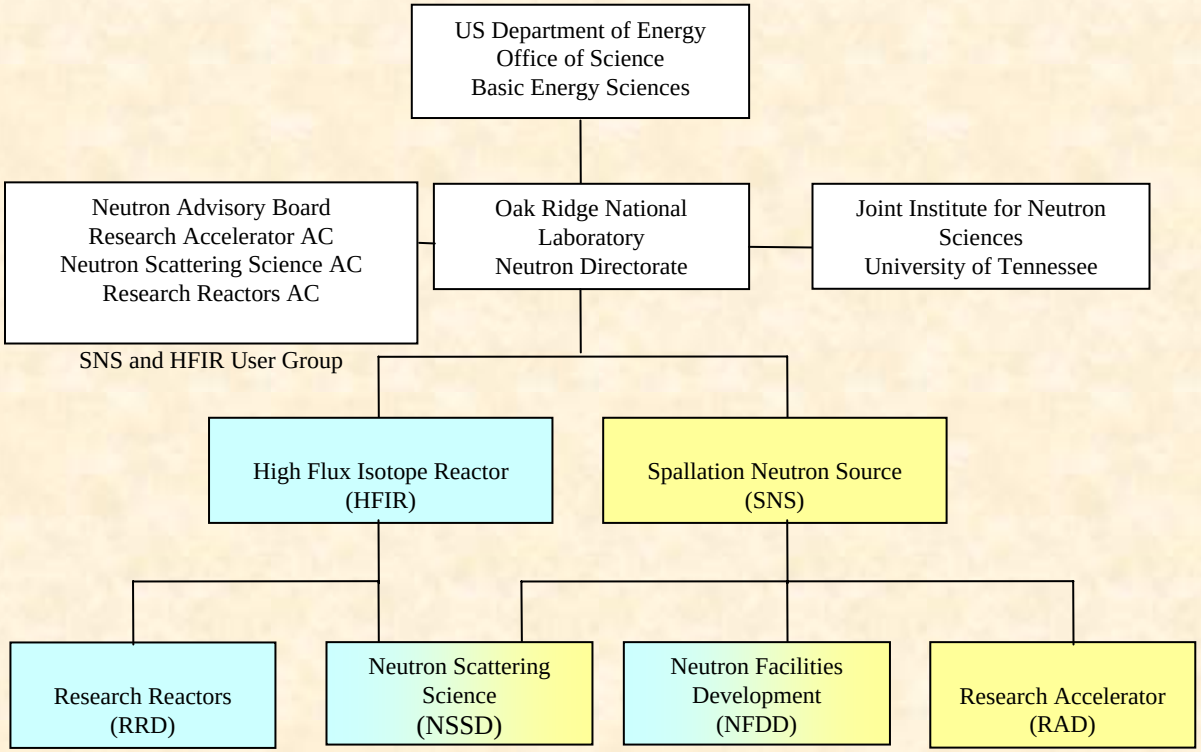
Alignment of Mission and Organization





- **We are planning to integrate neutron activities at ORNL**
  - **SNS transition to operations**
  - **Completion of HFIR cold source**

Programmatic Organization

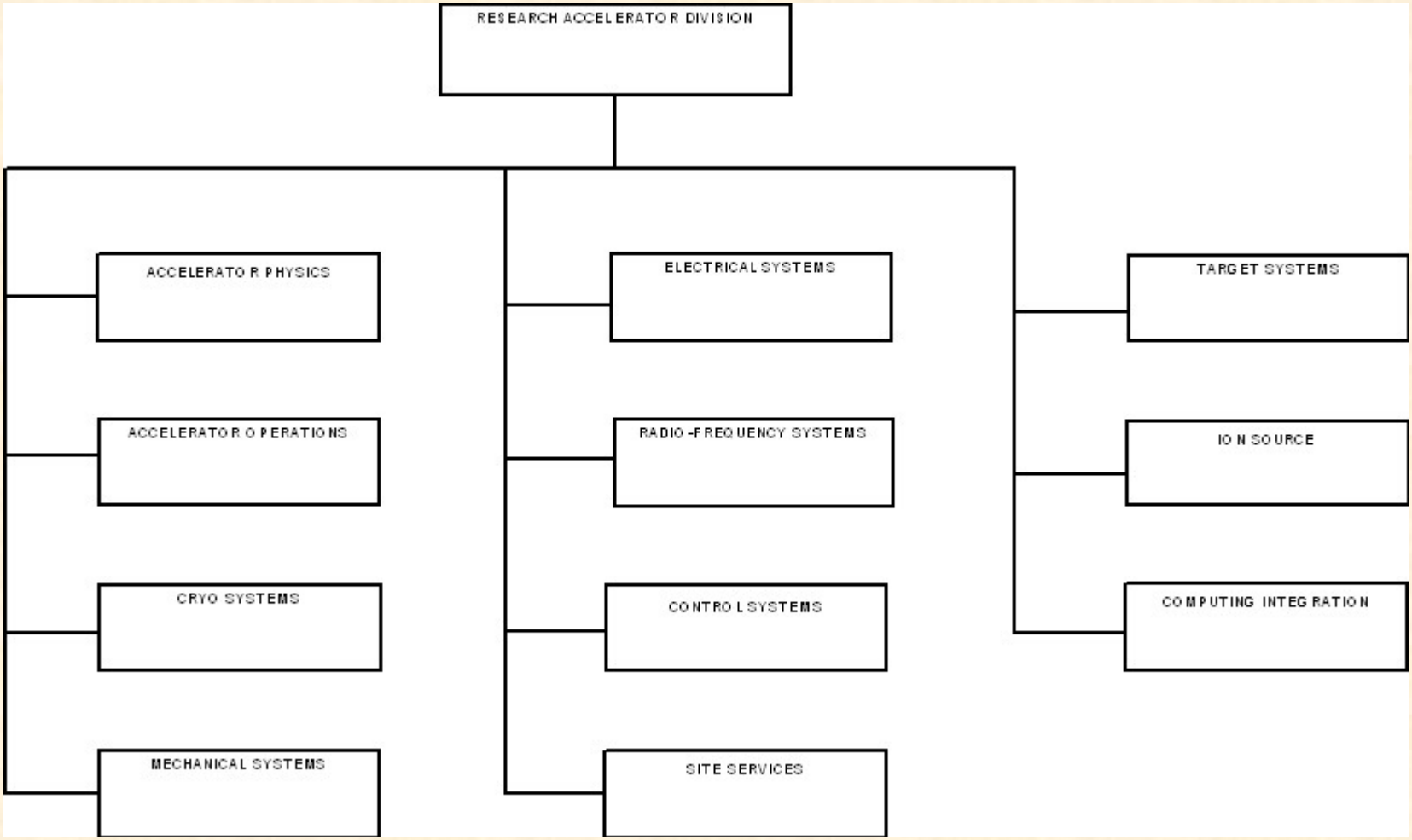


- **Announce details of organization in ~July after consultation with affected staff and appointment of NFD and RAD Directors**
- **Implement Oct. 1, including revised Advisory structure**

NSSD Organization

- **Meeting tomorrow morning with instrument folks from SNS & HFIR to discuss**
  - **9 am ORNL Conference Center**
- **Concept is line management organized by Instrument Classes**
  - **Easily maps onto separate SNS & HFIR facility budgets since instruments go with specific facility**
  - **Line manager roles in staffing, budgets, ES&H, user program etc line up with the instruments**
- **Institute Scientific Centers associated with the various research areas that cut across the instrument suite**
  - **Provides the context for staff research interests and activities**
  - **Drive collaborations with ORNL research divisions (MSTD, CSD, LSD,…)**
  - **Foster new science initiatives, funding proposals, workshops,…**
  - **Interface with the corresponding peer review panels which will also be organized by scientific area**

Proposed Research Accelerator Division



Proposed Neutron Facilities Development Division